April 7, 2010

Michael Graham
Public Information Officer
City of Tucson Department of Transportation
201 N. Stone Avenue
Tucson, AZ 85701

Re: Preliminary Analysis of Opening Year (2012) Operations
Kolb/Sabino Canyon Road Extension Project

Mr. Graham:

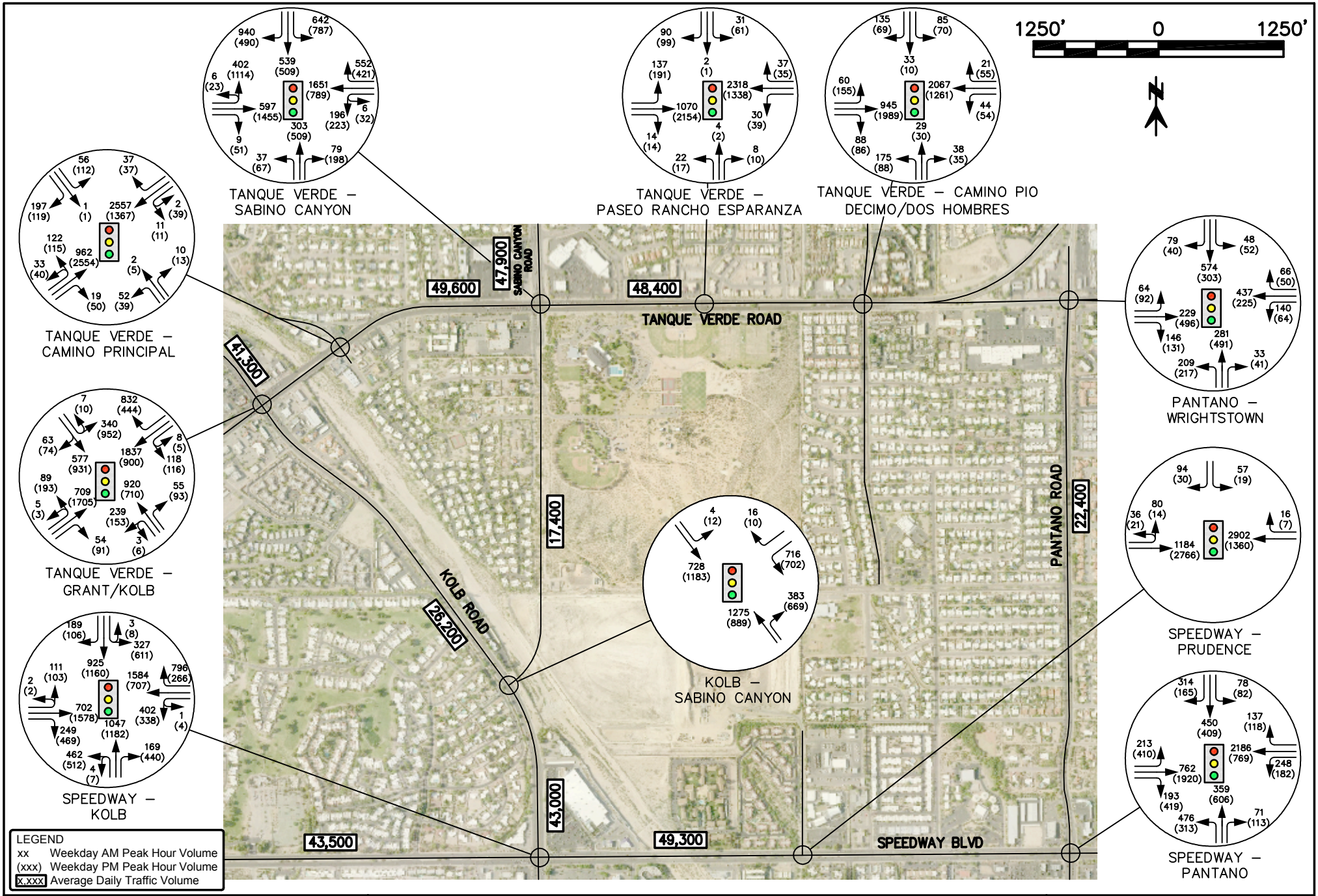
The purpose of this memorandum is to document the preliminary Level of Service (LOS) analysis completed for the opening year of the Kolb/Sabino Canyon Road Extension project. Although this scenario is not part of the Traffic Study requirements, the opening year conditions were evaluated to facilitate the air quality analysis and to quantify the initial operational improvement provided by the project.

Projected 2012 Traffic Volumes

In order to determine the projected 2012 traffic volumes for the project area, the assumptions used to develop the projected 2030 volumes in the initial traffic engineering report for this project were used. Those assumptions include a 1.1% yearly growth rate and the redistribution of traffic as detailed in the initial traffic engineering report. Figure 1 on the following page shows the projected 2012 turning movement volumes at all of the intersections in the larger project area as well as the daily traffic volumes in the immediate project vicinity. Recall that the morning peak hour was found to be from 7:30 AM to 8:30 AM and the evening peak hour was found to be from 4:30 PM to 5:30 PM.

At the intersection of Tanque Verde Road and Sabino Canyon Road, the southbound right turns and eastbound left turns will continue to represent the highest turning volumes. However, as a result of the new roadway connection, the southbound right turn and eastbound left turn volumes will be lower in 2012 than they are under existing conditions. Southbound right turns will be reduced by 22% in the AM peak hour and 28% in the PM peak hour, and eastbound left turns will be reduced by 17% in each peak hour. Other turning movement volumes will be reduced as well, including southbound left turns (22% reduction in each peak hour) and westbound right turns (22%).

In addition to the changes in volumes at the Tanque Verde Road and Sabino Canyon Road intersection, there will be noticeable changes at additional intersections in the project area. At Tanque Verde Road/Grant Road/Kolb Road, the westbound left turns will be reduced by 80% in the AM peak hour and 78% in the PM peak hour when the project is constructed.



SABINO CANYON ROAD - TANQUE VERDE RD TO KOLB RD INITIAL TRAFFIC ENGINEERING REPORT

PROJECTED TRAFFIC VOLUMES WITH PROJECT OPENING YEAR - 2012

PSOMAS

APRIL 2010

Further, the northbound right turns at the same intersection will be reduced by 76% in the AM peak hour and 83% in the PM peak hour. The significant reductions at this intersection are due to the high number of vehicles that will be traveling along the new roadway, and will therefore no longer have to detour through the Tanque Verde Road/Grant Road/Kolb Road intersection.

At the intersection of Speedway Boulevard and Kolb Road, there will be a slight increase in volumes. For example, the northbound throughs will increase 21% in the AM peak hour and 18% in the PM peak hour. Further, the southbound volumes at the intersection will increase between 5% and 30%. In addition, there will be a new signalized intersection where the new roadway meets Kolb Road, which will impose additional delays upon vehicles traveling on Kolb Road between Tanque Verde Road and Speedway Boulevard. The new intersection is expected to operate very efficiently, but even so, vehicles on Kolb Road will have to stop at an additional signalized intersection (compared to existing conditions) once the project is constructed.

Projected 2012 Level of Service (Preliminary Analysis)

The LOS for the project's opening year was evaluated using *Synchro 7*, a traffic analysis software that follows the methodology of the *Highway Capacity Manual*, and the same software that was used to determine the existing and projected LOS in the *Initial Traffic Engineering Report, Kolb Road: Connection to Sabino Canyon* (Psomas, October 2009). LOS ranges from A to F, with A representing the best operating conditions and F representing the worst. LOS D is generally considered acceptable for major intersections in an urban area.

The results of the opening year LOS analysis, which are based on the proposed road geometry and a preliminary traffic signal timing plan, are included in Table 1 on the following page. As seen in the table, the intersections are all expected to operate at LOS D or better in the AM peak hour and at LOS E or better in the PM peak hour. However, there are four movements that will operate at LOS F, all in the PM peak hour. This is compared to 18 movements (AM and PM combined) that currently operate at LOS F.

Table 2 provides a comparison of the existing intersection delays and the projected intersection delays in the opening year of the project (2012). As seen in the table, the delays at the intersections of Tanque Verde Road/Grant Road/Kolb Road and Tanque Verde Road/Sabino Canyon Road will be significantly lower in the opening year of the project (2012) than they are under existing conditions. The delays at the intersection of Speedway Boulevard and Kolb Road are expected to increase somewhat, partially due to the background growth of the traffic volumes (which will occur whether or not the project is constructed) and partially due to the traffic that will be redirected through the intersection once the project is constructed. The table also shows the projected intersection delays at the new intersection. As shown in the table, the new intersection is expected to operate with minimal delays in the opening year of the project.

Table 1. Opening Year (2012) Delays and LOS – With Project

		Kolb Road/Grant Road and Tanque Verde Road												
		Eastbound			Westbound			Northbound			Southbound			Total
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Intersection
AM	LOS	D	C	A	B	C	A	D	C	A	D	D	D	C
	Delay	50.3	25.4	4.6	12.9	22.8	5.5	40.1	25.4	5.4	44.3	53.2	53.2	26.4
PM	LOS	D	D	B	E	B	A	E	D	B	E	D	D	D
	Delay	38.9	50.0	13.8	64.4	19.1	1.7	67.4	51.0	13.0	65.8	42.5	42.5	43.1

		Sabino Canyon Road and Tanque Verde Road												
		Eastbound			Westbound			Northbound			Southbound			Total
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Intersection
AM	LOS	E	C	C	B	D	B	C	E	C	D	D	C	D
	Delay	65.0	28.5	28.5	18.4	47.1	14.7	29.9	76.2	20.7	43.8	44.9	31.1	40.4
PM	LOS	E	D	D	D	E	D	B	E	D	F	D	A	E
	Delay	70.1	39.3	39.3	53.1	78.4	36.2	18.0	78.4	41.4	88.1	39.7	5.7	55.5

		New Intersection												
		Eastbound			Westbound			Northbound			Southbound			Total
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Intersection
AM	LOS				C		A		A	A	A	A		B
	Delay				29.9		3.6		7.7	0.3	1.5	4.8		11.2
PM	LOS				C		A		A	A	A	A		A
	Delay				29.9		5.5		2.8	7.2	3.1	3.8		9.5

		Kolb Road and Speedway Boulevard												
		Eastbound			Westbound			Northbound			Southbound			Total
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Intersection
AM	LOS	C	D	A	B	C	A	E	D	A	D	D	C	D
	Delay	33.8	41.2	5.7	13.8	24.9	9.6	67.6	54.4	10.0	35.6	46.5	31.2	35.6
PM	LOS	C	F	C	F	D	B	E	E	F	E	D	B	E
	Delay	23.6	82.4	21.1	116.2	39.5	14.1	76.4	69.1	97.9	79.8	50.4	12.6	65.4

Table 2. Comparison of Intersection Delays

	AM Peak Hour		PM Peak Hour	
	Existing (sec/veh)	Opening Year (sec/veh)	Existing (sec/veh)	Opening Year (sec/veh)
Tanque Verde Rd/Grant Rd/Kolb Rd	40.5	26.4	92.8	43.1
Tanque Verde Rd/Sabino Canyon Rd	55.9	40.4	102	55.5
Speedway Blvd/Kolb Rd	27.1	35.6	52.7	65.4
New Intersection	N/A	11.2	N/A	9.5

Conclusion

When the Kolb/Sabino Canyon Road Extension project is completed and opened in 2012, it is expected to provide relief for the intersection of Grant Road/Kolb Road and Tanque Verde Road, since drivers will have a direct route to travel south on Kolb Road and will therefore no longer have to travel through the Grant Road/Kolb Road/Tanque Verde Road intersection. Further, because many of the vehicles that previously made southbound right or left turns at the intersection of Sabino Canyon Road and Tanque Verde Road to travel south (and eastbound left

turns or westbound right turns when returning to the north) will now travel straight through the intersection, it is expected that the operation of that intersection will significantly improve as well. Therefore, even with the project increase in volumes between now and 2012, it is expected that the construction of this project will reduce delays and improve operations throughout the project area.

If you have any questions related to the preceding discussion, please do not hesitate to contact us.

Respectfully Submitted,

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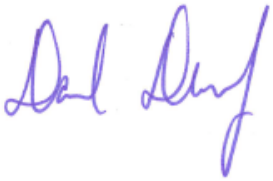

Darlene Danehy, P.E., LEED AP
Traffic Engineering Designer